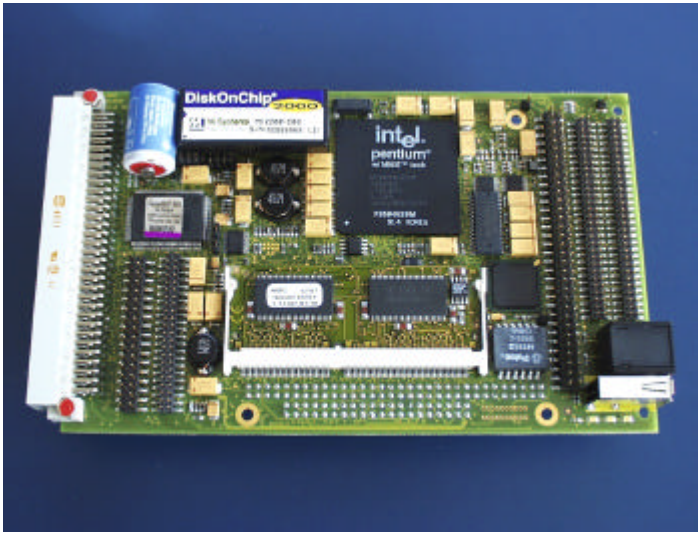
EURO-Pentium

ISA96 (AT96)
All-In-One CPU Card

User's Manual
Version 2.0



MSC Vertriebs GmbH
PC-Systemtechnik

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1. General Information

1.1. Introduction

The EURO-Pentium is an all-in-one single board Pentium computer card for the ISA-96 bus (AT-96 option is available).

With an onboard LCD/CRT SVGA controller and an 100BaseT Ethernet controller, the EURO-Pentium packs all the functions of an industrial computer and its display capabilities onto a single, EURO-size (100x160mm) card. This makes the EURO-PENTIUM an ideal solution for embedded applications.

The EURO-Pentium is based on the INTEL Low Power Embedded Pentium CPU (Tillamook) running at 266MHz. The core voltage of this cpu is only 2.0V, so the power consumption of the board is very low.

The EURO-PENTIUM supports 3.3V SDRAM (or EDO). It provides a 144-pin standard SO-DIMM socket giving you the flexibility to configure your system from 8 MB to 256 MB of (S)DRAM .
A second level cache of 512KByte improves the performance.

The onboard PCI-bus, flat panel/CRT SVGA controller uses the CHIPS 69000 chipset with 2 MB of SDRAM built in chip. This controller, connected to the local PCI-bus, is a 64-bit graphics engine. The board supports various LCD types, including TFT (LVDS or digital interface), DSTN, MONO, and EL.

Another onboard PCI device is the 100MBit Ethernet controller (82559ER). A standard RJ45 100BaseT connector is provided.

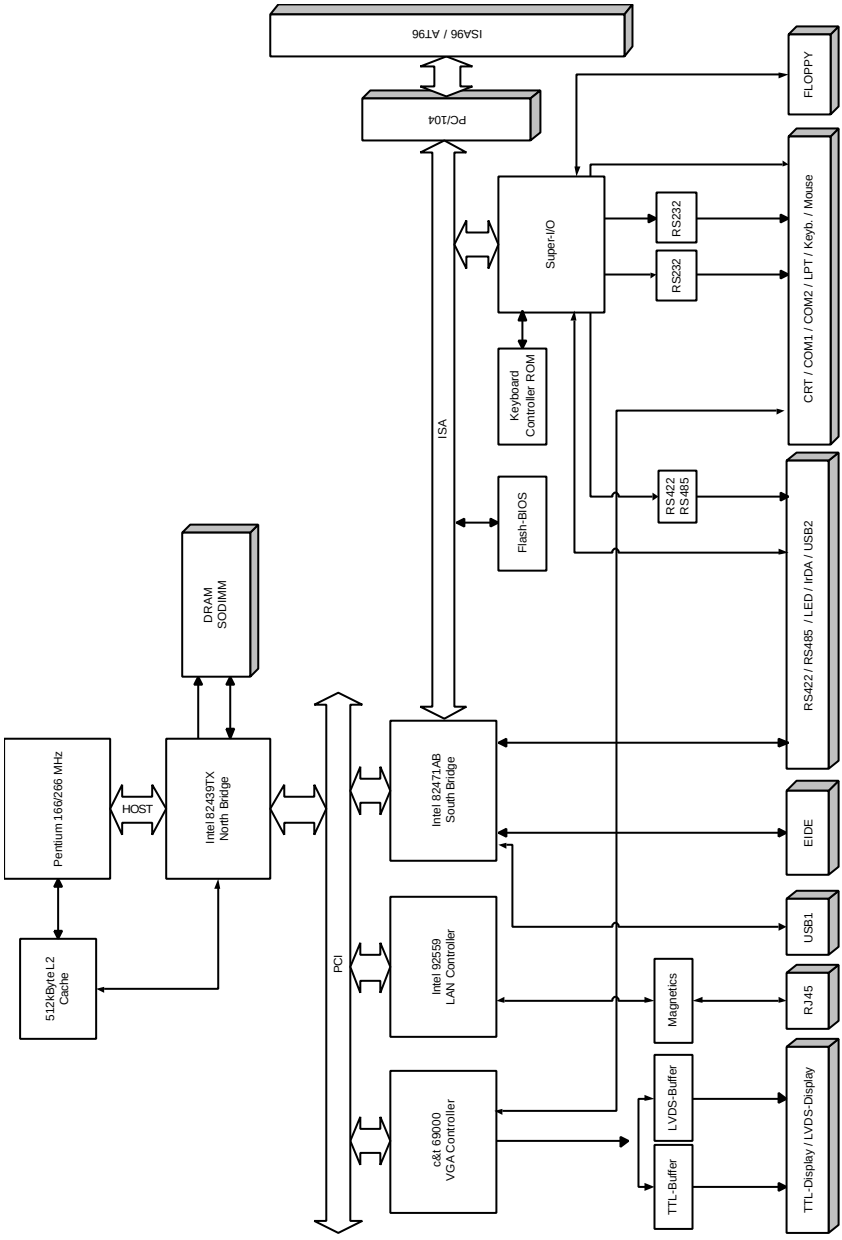
The EURO-PENTIUM includes a high speed, local bus IDE controller. This controller supports (through ATA PIO) mode3 and mode 4 hard disks, and Ultra DMA/33, enabling data transfer rates up to 33 MB/second. Up to two IDE devices can be connected, including large hard disks, CD-ROM drives, tape backup drives, or other IDE devices.

Onboard features include two high-speed RS-232 serial ports (one configurable as RS422/485), one bidirectional SPP/EPP/ECP parallel port, one floppy drive controller and two USB ports.

A standard DiskOnChip socket allows to install up to 144MByte Flashdisk.

A PC/104 interface (on solder side) is an additional option of the EURO-Pentium card.

1.2. Block Diagram



1.3. Specifications

Core:

CPU:

Intel Low-Power Embedded Pentium ® Processor with MMX™ Technology
166 MHz / 266 MHz , 352-ball HL-PBGA

ChipSet:

Intel 82430TX PCISet
Intel 82439TX North Bridge
82371AB PCI-to-ISA/IDE eXcelerator (South Bridge)

Cache:

512 kByte Pipelined Burst Cache

Memory:

1 standard 144-Pin SO-DIMM socket
4Mbit, 16Mbit, 64Mbit 3.3V technology
min. 8MByte, max. 256MByte

ISA-Bus Interface:

Bus Controller 82371AB (PIIX4)
ISA96 (optional AT96) - Bus
PC/104 (optional, solder side)

Video:

Chips & Technologies 69000 PCI VGA Controller
2MB internal SDRAM (64-Bit)
CRT-Interface
LCD-Interface
3.3V TTL Interface
5V TTL Interface
3.3V LVDS Interface 18-Bit, 1 Pixel/Clock
3.3V LVDS Interface 18-Bit, 2 Pixel/Clock (option)

Ethernet (optional):

INTEL 82559ER Ethernet Controller 10/100 MBit
RJ45 Interface

USB:

2 USB 1.0 ports (1.5MBit/s oder 12MBit/s)

EIDE:

82371AB (PIIX4)
Ultra DMA/33
PIO Mode 4
PCI IDE Busmaster

Floppy:

ALI M5133XF Super-I/O
Standard Floppy Disk Interface
360kB/720kB/1,2MB/1,44MB/(2,88MB)

Serial:

ALI M5133XF Super-I/O
1 x RS232
1 x RS232/RS422/RS485/IrDA configurable

Parallel:

ALI M5133XF Super-I/O
1 parallel port (PS/2-compatible / ECP/EPP via SETUP configurable)

Keyboard, Mouse:

ALI M5133XF Super-I/O
MFII-Keyboard Interface
PS/2-Mouse Interface

BIOS:

256 kByte Flash (PLCC32) Boot Block 29F002
System-BIOS and VGA-BIOS

Flashdisk:

M-Systems DiskOnChip 2000 32pin socket

Real Time Clock:

integrated in 82371AB (South Bridge)
Lithium battery SL-350, 3,6V / 1000mAh , -55°..+85° C

Power supply:

+5V	±5%	
+12V	±5%	only if required for PC/104
-12V	±5%	only if required for PC/104

Power supply current:

+5V	ca. 2A	266 MHz CPU
+12V		depends on PC/104 requirements
-12V		depends on PC/104 requirements

Environment :

Temperature: $T_{ambient}$ = 0 .. 60°C

Mechanical:

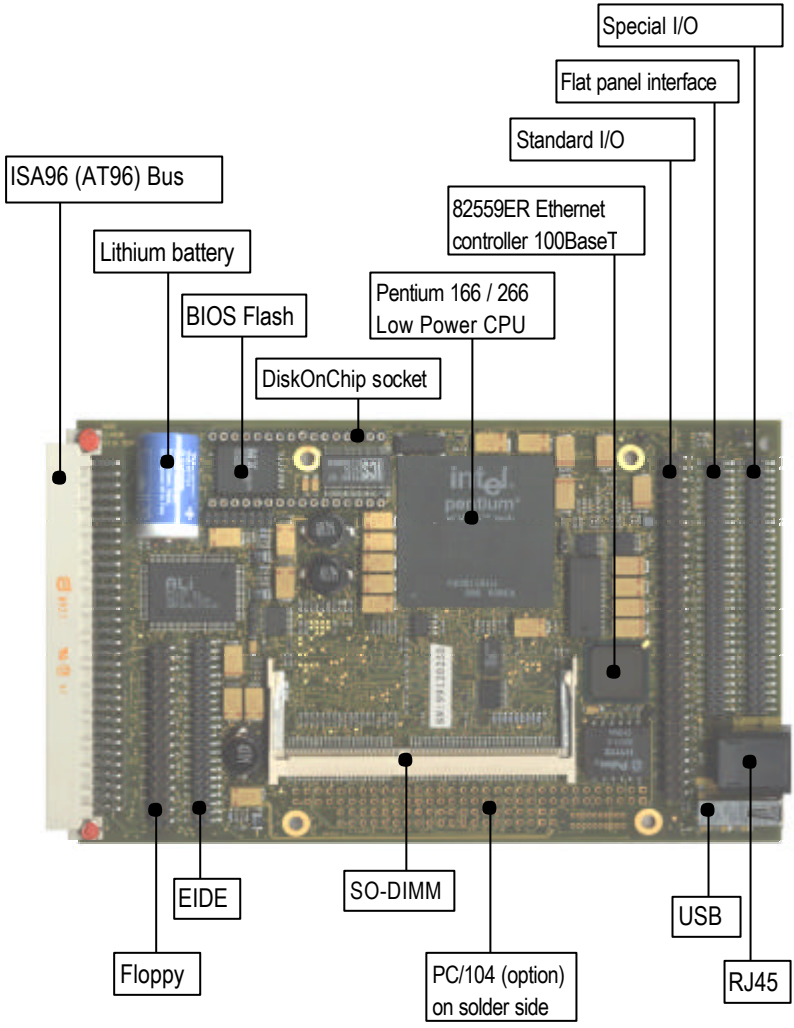
Connectors:

Function	Type
ISA96 (AT96) bus	96pin VG connector
Floppy	34pin 2.54mm pin header (SMD)
EIDE	44pin 2mm pin header (SMD)
Standard I/O	64pin 2.54mm pin header (SMD)
LCD (digital, LVDS)	60pin 2mm pin header (SMD)
Special I/O	60pin 2mm pin header (SMD)
USB (1 channel)	Standard vertical USB connector (2nd channel available on special I/O connector)
Ethernet	RJ45 100BaseT connector

Dimensions:

	160 x 100 mm
Height:	max. 17 mm (component side)
	max. 3mm (solder side, without PC/104 option)

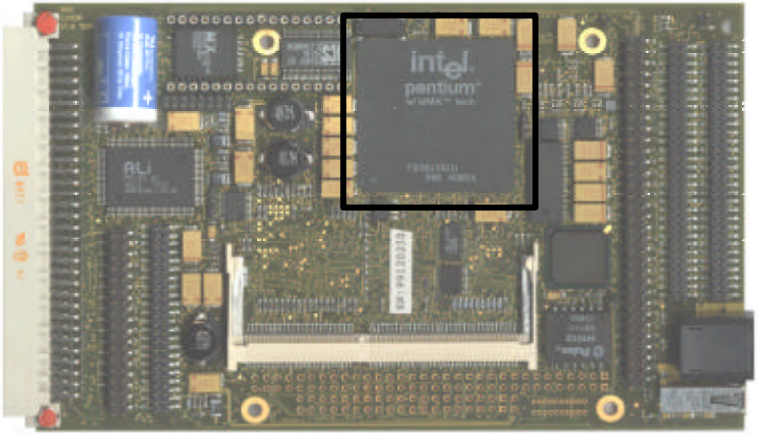
1.4. Board Layout



2. Installation

2.1. Jumpers

2.1.1. CPU



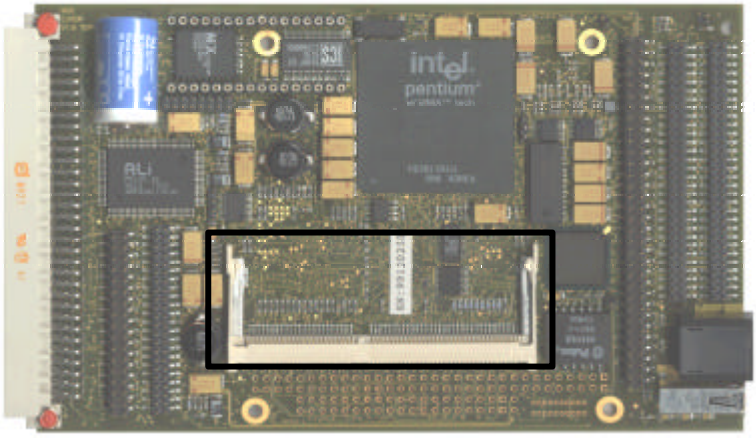
The CPU is an INTEL Low Power Embedded 166/266 MHz Pentium in the HL-PBGA package. It is soldered so it cannot be removed or exchanged.

The clock ratio, core voltage, I/O voltage and external clock are installed by factory, the user does not have to set switches or jumpers.

The core voltage is 2.0V for the 266MHz version and 1.8V for the 166MHz version. The I/O voltage is 2.5V.

The HL-PBGA package has excellent thermal parameters, the maximum case temperature is 95°C. The board is shipped with a passive heatsink.

2.1.2. Installing a DRAM SO-DIMM module



The EURO-Pentium board has a SO-DIMM socket for standard 3.3V SO-DIMM modules :

Module organization	Capacity
2M x 64	16 MByte
4M x 64	32 MByte
8M x 64	64 MByte
16M x 64	128 MByte
32M x 64	256 MByte

Fast Page Mode, EDO or SDRAM-Modules (3.3V) can be used. Access time should be 60ns (or faster) , maximum module height is 25,4 mm.

2.1.3. DiskOnChip

The DiskOnChip 2000 family of products provides a single chip solid-state flash disk in a standard 32-pin DIP package. The DiskOnChip 2000 is a solid-state disk with no moving parts, resulting in a significant reduction in power consumption and an increase in reliability.
The DiskOnChip is a small plug and play Flash disk. It is easy to use. And it saves integration overhead.

The DiskOnChip 2000 family of products is available in capacities ranging from 8MB up to 144MB, unformatted. In order to manage the disk, the DiskOnChip 2000 includes the TrueFFS, M-Systems Flash File System proprietary software. The DiskOnChip 2000 package is pin-to-pin compatible with a standard 32-pin EPROM device.

When the DOC is installed correctly, it will work like a HDD or a FDD. To install the DOC on the mainboard, follow the instructions below:

1. *Plug the DOC into the socket. Make sure pin 1 of the DOC is aligned with pin 1 of the socket.*
2. *Push the DOC into the socket until it is firmly seated in the socket.*

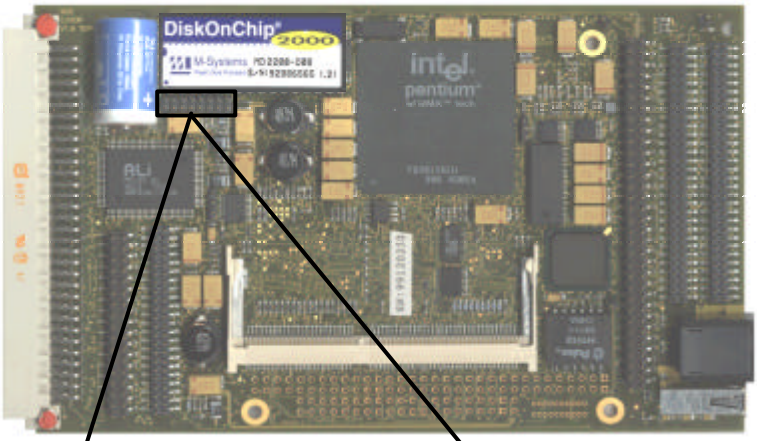
   Caution: the DOC may be permanently damaged if it is installed incorrectly !

3. *Set the jumpers for the memory address of the DOC (see table on next page)*

Configure DOC as a boot device

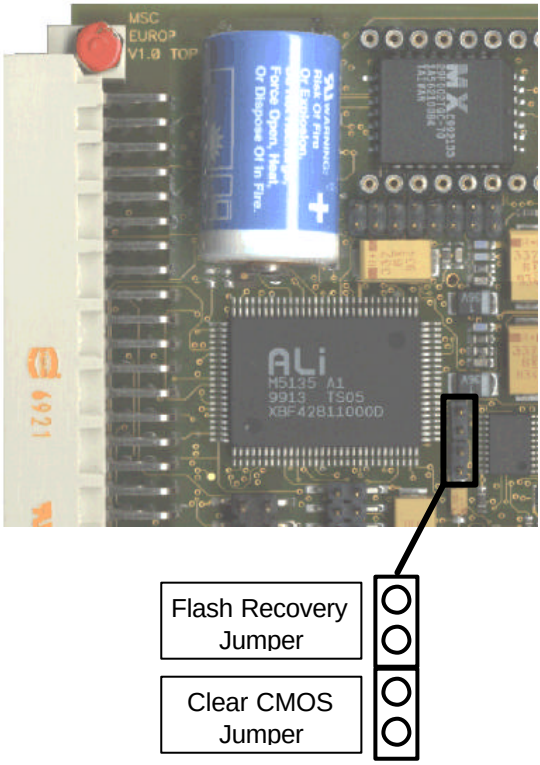
To configure a DOC as a boot drive, you should copy the operating system files onto the DOC. The following procedure is an example of the initialization process.

1. *Install a DOC into your system.*
2. *Insert a bootable floppy disk in drive A: and boot the system.*
3. *At the DOS prompt, type SYS C: to transfer the DOS system files to the DOC (assuming the DiskOnChip is installed as drive C:). Reboot the system.*
4. *Go to the BIOS Setup Utility. Set the type of Primary Master or C: Drive as Not Installed.*
5. *Remove the floppy disk from the drive A: and leave the BIOS Setup Utility. The system should boot from the DOC.*



Jumper	Address Range (8K block size)	Jumper	Address Range (8K block size)
	used for VGA-BIOS		D4000 .. D5FFF
	used for VGA-BIOS		D6000 .. D7FFF
	CC000 .. CDFFF		D8000 .. D9FFF
	CE000 .. CFFFF		DA000 .. DBFFF
	D0000 .. D1FFF (default configuration)		DC000 .. DDFFF
	D2000 .. D3FFF		DE000 .. DFFFF

2.1.4. Clear CMOS data and Flash Recovery Jumper



Clear CMOS Jumper :

To clear the contents of the CMOS (setup configuration) the following procedure has to be done :

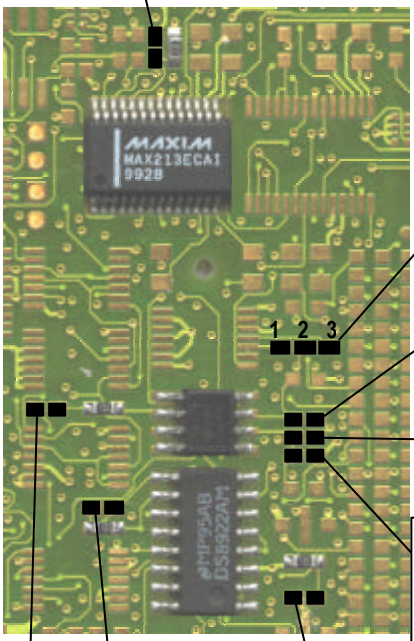
1. *Disconnect power*
2. *Remove jumper for a few seconds*
3. *Install jumper again*

Flash Recovery Jumper :

If removed, the Flash Recovery Jumper forces a Flash BIOS update via floppy disk.

2.1.5. RS232/422/485 select (COM2)

COM2 RS232 buffer control
open : COM2 RS232 enabled (default)
closed: COM2 RS232 disabled



RS485 buffer (75176) control
1-2 : COM2DTR enables Transmitter / Receiver
2-3 : COM2DTR# enables Transmitter / Receiver

RS485 Transmitter (75176) control
closed : T_Enable = COM2DTR
open : T_Enable = disabled (low, default)

RS485 Receiver (75176) control
closed : R_Enable# = COM2DTR
open : R_Enable# = disabled (high, default)

RS485 Receiver (75176) control
closed : R_Enable# = enabled (low) , RS422 mode
open : R_Enable# = disabled (high), RS232 mode, default

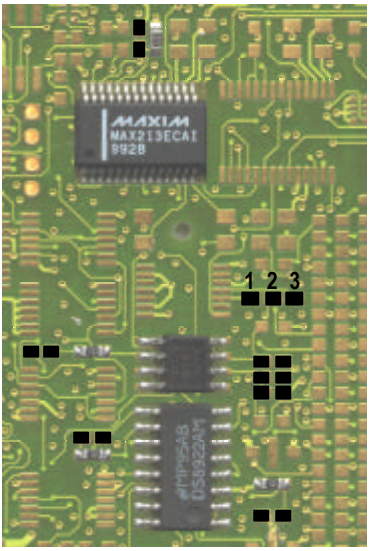
RS422 Transmitter (8922) control
closed : Transmitter enabled
open : Transmitter disabled (default)

100 Ohm termination resistor CTS
closed : 100 Ohm termination
open : no termination (default)

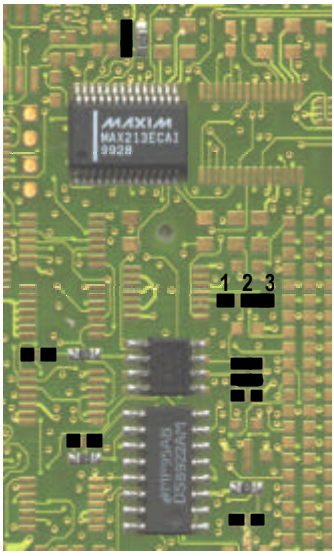
100 Ohm termination resistor RxD
closed : 100 Ohm termination
open : no termination (default)

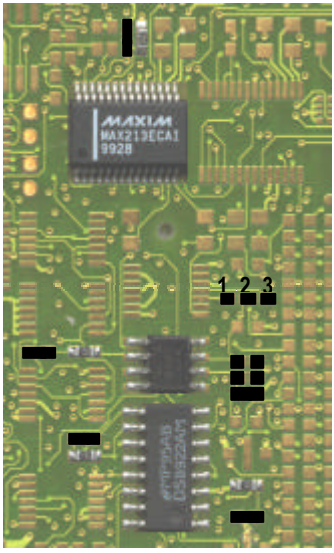
Configuration examples :

RS232 Mode (default)



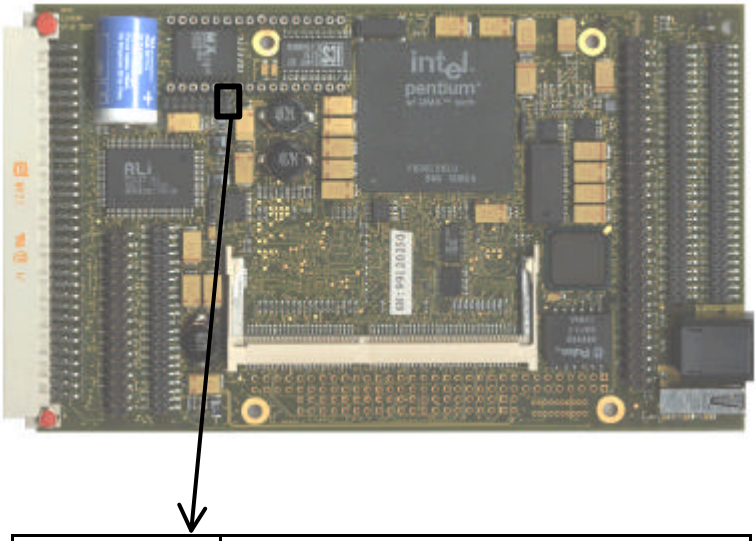
RS485 mode
COM2DTR# controls Transmitter
(DTR# = low = Transmitter enabled)

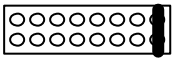
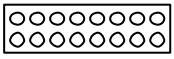




RS422 mode
100 Ohm termination on RxD and CTS

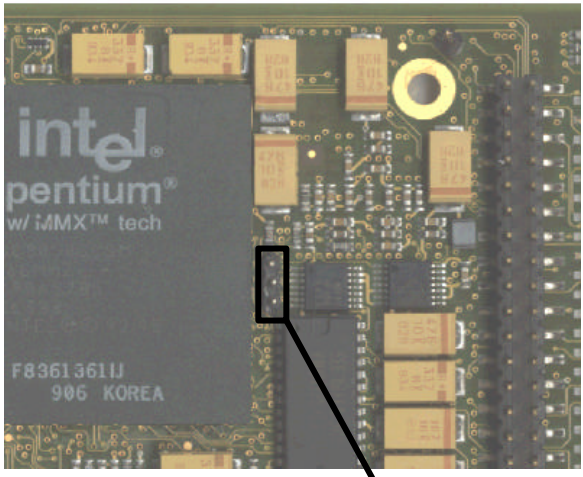
2.1.6. Disable Boot Block Write Protection



	**Boot Block write protection disabled**
	**Boot Block write protected (default)**

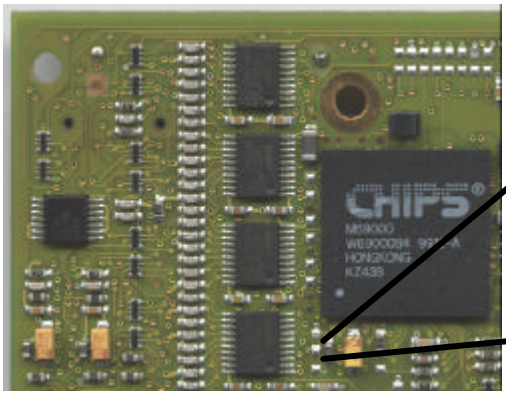
Note : +12V from the ISA96 (AT96) bus are required for programming the Boot Block .

2.1.7. LCD Interface select, LCD driver level



LVDS interface enabled

Digital interface enabled

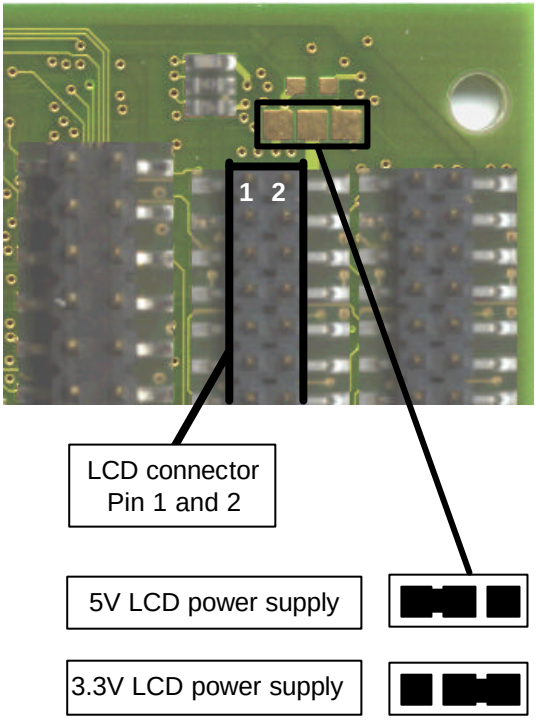


Digital interface driver level

+ 5V

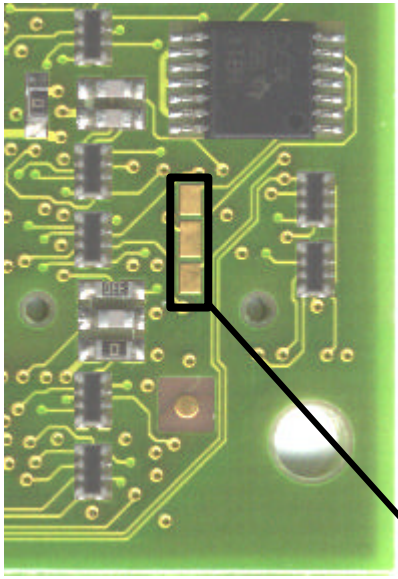
+ 3.3V

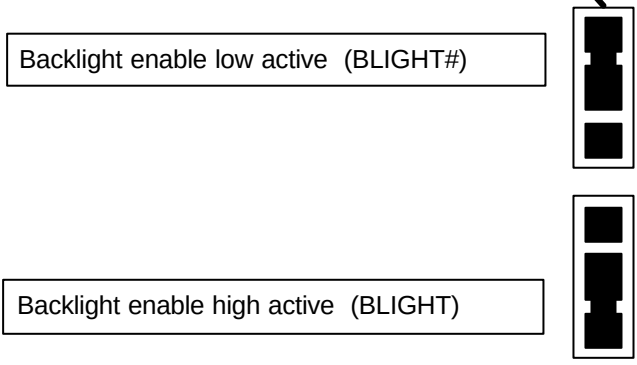
2.1.8. LCD power supply select



Note: This jumper is not available on Rev. 1.0 boards (LCD power is +5V)

2.1.9. LCD backlight enable polarity





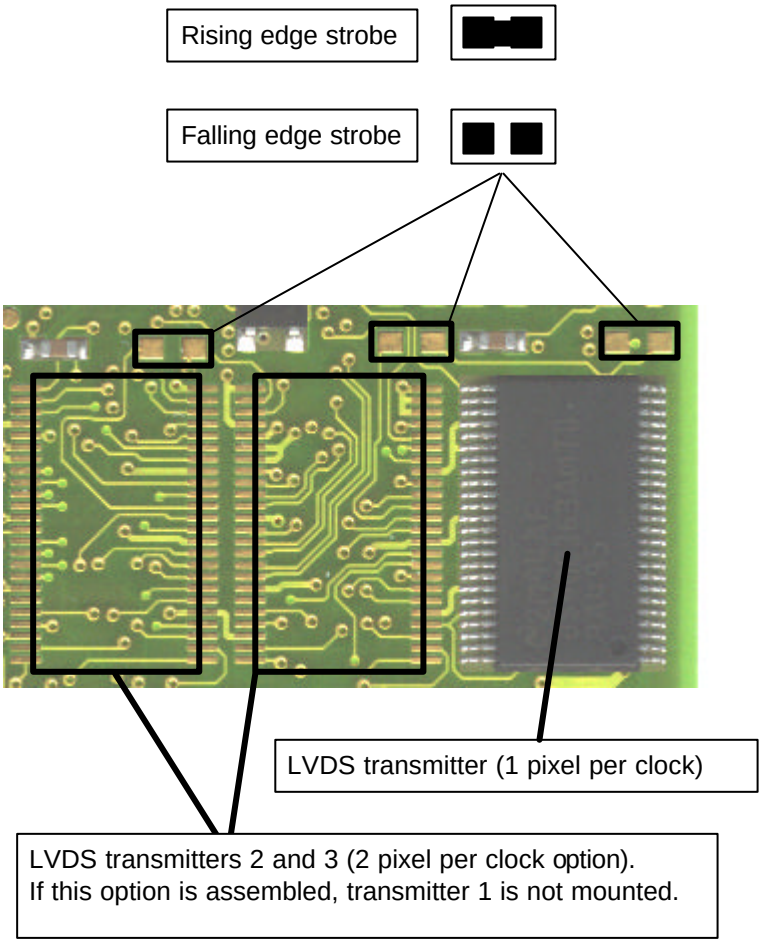
The backlight enable signal (BLIGHT or BLIGHT#) is on pin 6 of the LCD connector.

Note: The polarity jumper is not available on Rev. 1.0 boards.

2.1.10. LVDS driver polarity

The EURO-Pentium has a 1 pixel per cock LVDS transmitter (DS90C363A) on board (2 pixel per clock is an option).

The strobe signal polarity (rising or falling edge) is selected via solder jumpers :


Rising edge strobe
Falling edge strobe
LVDS transmitter (1 pixel per clock)
LVDS transmitters 2 and 3 (2 pixel per clock option).
If this option is assembled, transmitter 1 is not mounted.

2.2. Watchdog

The EURO Pentium board has a watchdog function implemented. If the watchdog is enabled, a counter is started which creates a reset if it is not retriggered within a defined time interval (1s).

The watchdog is controlled by a special I/O Port .
The I/O address is configurable via SETUP :

250h (default) , 270h or disabled .

The port contains three bits :

Bit	Dir	Function
0	r/w	watchdog trigger
1	r/w	system status
2	r/w	watchdog enable
3 ..7	r/w	not used

Bit 0 : Watchdog trigger

If the watchdog is enabled this bit has to be toggled within 1 second.
If it is not toggled in time, a reset will be generated.

Bit 1 : System status

This bit indicates whether a system start was caused by power on or by a reset. After watchdog initialisation this bit should be set to 1 by the application. If the bit is set it can only be reset by a power on cycle.

0 : Power ON (default)
1 : Reset

Bit 2 : Watchdog Enable

This bit enables the watchdog.
If the bit is set it can only be cleared by a reset or a power on cycle.

0 : Disable
1 : Enable

2.3. Interrupts, DMA channels, Upper memory

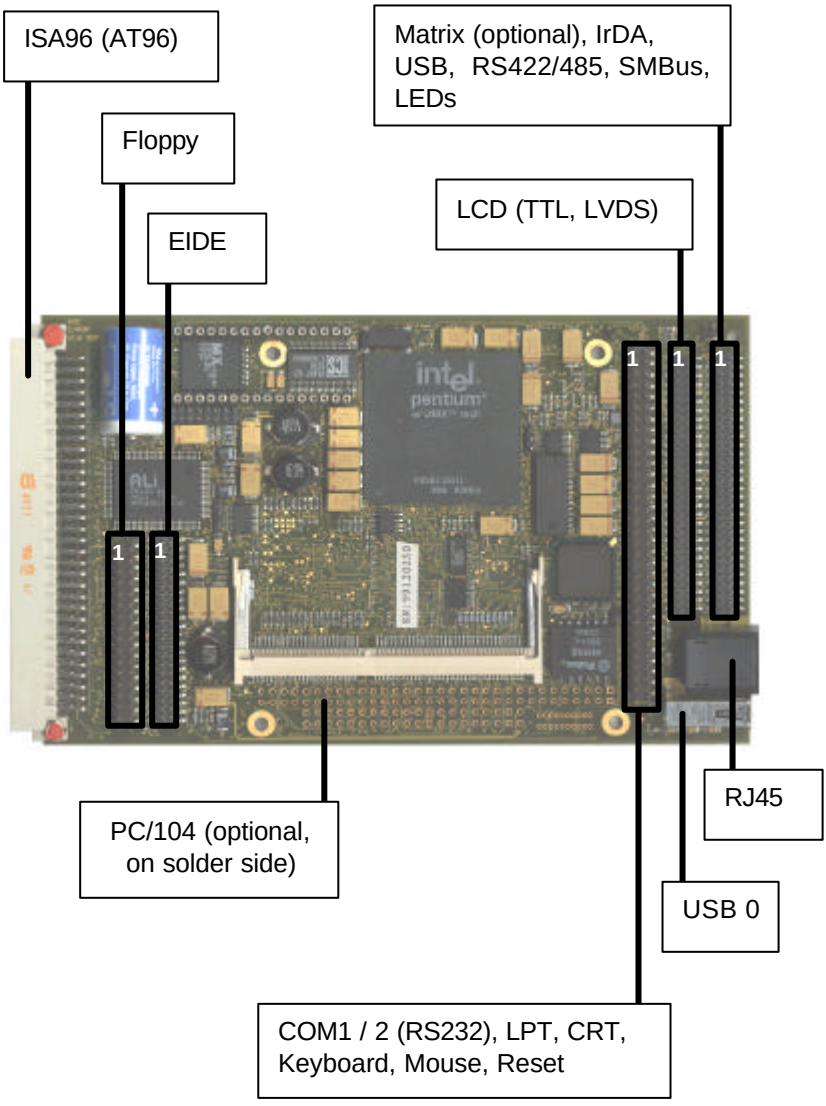
IRQ	used for	available	comment
0	Timer 0	No	
1	Keyboard	No	
2	Slave 8259	No	
3	COM2	No	(1)
4	COM1	No	(1)
5	-	Yes	
6	Floppy Disk Controller	No	(1)
7	LPT1	No	(1)
8	Real Time Clock	No	
9	(Ethernet Controller / USB)	(No)	(2)
10	-	Yes	
11	(VGA-Controller)	(No)	(2)
12	PS/2 Mouse	No	(1)
13	Floating Point Unit	No	
14	IDE0	No	(1)
15	-	Yes	

(1) If the device is disabled in SETUP, the interrupt is available.
(2) If the PCI-Ethernet controller and/or the PCI-VGA-Controller are present, typically the IRQs 9 and 11 are allocated by the BIOS. This can be changed via SETUP.

DMA	used for	available	comment
0	- - -	Yes	
1	(ECP, if enabled)	(No)	Alternate ECP setting
2	Floppy Disk Controller	No	
3	(ECP, if enabled)	(No)	LPT ECP mode (default)
4	Cascade	No	
5..7	- - -	Yes	

Upper Memory	used for	available	comment
C0000h..CBFFFh	VGA BIOS	No	
CC000h..DFFFFh		Yes	ISA bus or shadow RAM (DiskOnChip)
E0000h..E3FFFh	(USB legacy)	(No)	Selectable via SETUP
E4000h..E7FFFh		Yes	ISA bus
E8000h..FFFFFh	System BIOS	No	Exact value is displayed on summary screen

2.4. Connectors



2.4.1. ISA96 (AT96, optional)

Pin	a	b	c
1	GND	/MASTER (/SBHE)	/IOCHCK
2	RESET	SD15 (/MEMCS16)	SD7
3	+5V	SD14 (SA23)	SD6
4	IRQ9	SD13 (/IOCS16)	SD5
5	/MEMR (LA17/n.c.)	SD12 (SA22)	SD4
6	DRQ2	SD11 (IRQ10)	SD3
7	-12V	SD10 (SA21)	SD2
8	/0WS	SD9 (IRQ11)	SD1
9	+12V	SD8 (SA20)	SD0
10	GND	/SBHE (IRQ12)	IOCHRDY
11	/SMEMW	LA23 (VBAT)	AEN
12	/SMEMR	LA22 (IRQ15)	SA19
13	/IOWC	LA21 (LA19/n.c.)	SA18
14	/IORC	LA20 (IRQ14)	SA17
15	/DACK3	LA19 (LA18/n.c.)	SA16
16	DRQ3	LA18 (/DACK0)	SA15
17	/DACK1	LA17 (/MEMR)	SA14
18	DRQ1	/DACK7 (DRQ0)	SA13
19	/REFSH	DRQ7 (/MEMW)	SA12
20	SYSCLK	/DACK6 (/DACK5)	SA11
21	IRQ7	DRQ6 (SD8)	SA10
22	IRQ6	/DACK5 (DRQ5)	SA9
23	IRQ5	DRQ5 (SD9)	SA8
24	IRQ4	/DACK0 (/DACK6)	SA7
25	IRQ3	DRQ0 (D10)	SA6
26	/DACK2	/MEMCS16 (DRQ6)	SA5
27	TC	/IOCS16 (SD11)	SA4
28	BALE	IRQ15 (SD12)	SA3
29	+5V	IRQ14 (SD13)	SA2
30	OSC	IRQ12 (SD14)	SA1
31	/MEMW (GND)	IRQ11 (SD15)	SA0
32	GND (DRQ7)	IRQ10 (/MASTER)	GND (/DACK7)

2.4.2. PC/104 (optional)

Pin	A	B	C	D
0	—	—	GND	GND
1	/IOCHCK	GND	SBHE#	MEMS16#
2	SD7	RESET	LA23	IOCS16#
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	/MEMR	LA20	IRQ12B
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	/0WS	LA17	DACK0#
9	SD0	+12V	MRDC#	DRQ0
10	IOCHRDY	GND	MWTC#	DACK5#
11	AEN	/SMEMW	SD8	DRQ5
12	SA19	/SMEMR	SD9	DACK6#
13	SA18	/IOWC	SD10	DRQ6
14	SA17	/IORC	SD11	DACK7#
15	SA16	/DACK3	SD12	DRQ7
16	SA15	DRQ3	SD13	+5 V
17	SA14	/DACK1	SD14	MASTER#
18	SA13	DRQ1	SD15	GND
19	SA12	/REFSH	KEY	GND
20	SA11	SYSCLK	—	—
21	SA10	IRQ7	—	—
22	SA9	IRQ6	—	—
23	SA8	IRQ5	—	—
24	SA7	IRQ4	—	—
25	SA6	IRQ3	—	—
26	SA5	/DACK2	—	—
27	SA4	TC	—	—
28	SA3	BALE	—	—
29	SA2	+5V	—	—
30	SA1	OSC	—	—
31	SA0	/MEMW	—	—
32	GND	GND	—	—

2.4.3. EIDE

Pin	Name	Pin	Name
1	/IDE-RESET	2	GND
3	DATA7	4	DATA
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	n.c.
21	DRQ0	22	GND
23	/IDEIOW	24	GND
25	/IDEIOR	26	GND
27	IORDY	28	+5V pull up
29	/DAK0	30	GND
31	INTRQ	32	n.c.
33	IDEADR1	34	n.c.
35	IDEADR0	36	IDEADR2
37	/IDECS0	38	/IDECS1
39	/IDEACTIV	40	GND
41	+5 V	42	+5 V
43	GND	44	reserved

2.4.4. Floppy

Pin	Name	Pin	Name
1	GND	2	/DENSEL
3	GND	4	n.c.
5	GND	6	DRATE0
7	GND	8	/INDEX
9	GND	10	/MOTOR1
11	GND	12	/DRVSEL2
13	GND	14	/DRVSEL1
15	GND	16	/MOTOR2
17	GND	18	DIR
19	GND	20	/STEP
21	GND	22	/WRDATA
23	GND	24	/WR GATE
25	GND	26	/TRACK 0
27	GND	28	/WRPROTECT
29	GND	30	/RDDATA
31	GND	32	HEADSEL
33	GND	34	/DISKCHANGE

2.4.5. COM1, COM2, LPT, CRT, Keyboard/Mouse, Reset

Pin	Name	Pin	Name
1	COM1: DCD1	2	COM1: DSR1
3	COM1: RXD1#	4	COM1: RTS1
5	COM1: TXD1#	6	COM1: CTS1
7	COM1: DTR1	8	COM1: RI1
9	GND	10	COM2: DCD2
11	COM2: DSR2	12	COM2: RXD2#
13	COM2: RTS2	14	COM2: TXD2#
15	COM2: CTS2	16	COM2: DTR2
17	COM2: RI2	18	GND
19	LPTSTROBE#	20	LPTAFD#
21	LPTD0	22	LPTERR#
23	LPTD1	24	LPTINIT#
25	LPTD2	26	LPTSLIN#
27	LPTD3	28	GND
29	LPTD4	30	GND
31	LPTD5	32	GND
33	LPTD6	34	GND
35	LPTD7	36	GND
37	LPTACK#	38	GND
39	LPTBUSY	40	GND
41	LPTPE	42	GND
43	LPTSLCT	44	
45	HDLED#	46	+5 V
47	SPEAKER#	48	n.c.
49	RESIN#	50	n.c
51	KBDDAT	52	GND
53	KBDCLK	54	MOUSEDAT
55	CRTRED	56	MOUSECLK
57	CRTBLUE	58	CRTGREEN
59	GND	60	n.c.
61	n.c	62	n.c.
63	CRTHS	64	CRTVS

2.4.6. Scan-Keyboard (optional), IrDA, USB, RS422/485, LED, SMBus

Pin	Name	Pin	Name
1	(KSI0)	2	(KSI1)
3	(KSI2)	4	(KSI3)
5	(KSI4)	6	(KSI5)
7	(KSI6)	8	(KSI7)
9	(KSO0)	10	(KSO1)
11	(KSO2)	12	(KSO3)
13	(KSO4)	14	(KSO5)
15	(KSO6)	16	(KSO7)
17	(KLED0)	18	(KLED1)
19	KEYLOCK#	20	(KLED2)
21	GND	22	+5 V
23	KBDCLK2	24	KBDDAT2
25	MOUSECLK2	26	MOUSEDAT2
27	GND	28	+5 V
29	IRTX	30	IRRX
31	IRMODE	32	nc
33	VCCUSB0	34	USB0-
35	USB0+	36	GNDUSB0
37	VCCUSB1	38	USB1-
39	USB1+	40	GNDUSB1
41	ELEDK	42	ELEDA
43	RS422/485_TxD+	44	RS422/485_TxD-
45	RS422/485_RxD+	46	RS422/485_RxD-
47	RS422/485_RTS+	48	RS422/485_RTS-
49	RS422/485_CTS+	50	RS422/485_CTS-
51	PWM0	52	PWM1
53	PWM0_SENSE	54	PWM1_SENSE
55	ETH_BUSY_LED	56	ETH_LINK_LED
57	ETH_SPEED_LED	58	+5 V
59	SMB_DATA	60	SMB_CLK

2.4.7. LCD (TTL, LVDS)

Pin	Name	Pin	Name
1	+5V /3.3V (*)	2	+5V /3.3V (*)
3	ENVDD#	4	ENVEE#
5	DE	6	BLIGHT / BLIGHT# (*)
7	HSLP	8	FLM
9	GND	10	SHFCLK
11	GND	12	GND
13	VPNL0	14	VPNL1
15	VPNL2	16	VPNL3
17	VPNL4	18	VPNL5
19	VPNL6	20	VPNL7
21	VPNL8	22	VPNL9
23	VPNL10	24	VPNL11
25	VPNL12	26	VPNL13
27	VPNL14	28	VPNL15
29	VPNL16	30	VPNL17
31	VPNL18	32	VPNL19
33	VPNL20	34	VPNL21
35	VPNL22	36	VPNL23
37	GND	38	GND
39	VLVDS7N	40	VLVDS7P
41	VLVDS6N	42	VLVDS6P
43	VLVDS5N	44	VLVDS5P
45	VLVDS4N	46	VLVDS4P
47	VLVDS3N	48	VLVDS3P
49	VLVDS2N	50	VLVDS2P
51	VLVDS1N	52	VLVDS1P
53	VLVDS0N	54	VLVDS0P
55	+5V	56	+5V
57	GND	58	GND
59	SMB_DATA	60	SMB_CLK

(*) +5V / +3.3V jumper selectable
(*) BLIGHT# / BLIGHT polarity jumper selectable

LCD signal description :

Pin	Name	
1	+5V / 3.3V	LCD power (Jumper)
2	+5V / 3.3V	LCD power (Jumper)
3	ENVDD#	Flat Panel VDD Enable
4	ENVEE#	Flat Panel VEE Enable
5	DE	DE = DE/M/Blank#
6	BLIGHT / BLIGHT#	Backlight Enable (Jumper)
7	HSLP	VHSLP = LP/CL1/DE/Blank# (HSYNC)
8	FLM	VVSFLM = FLM (VSYNC)
9	GND	
10	SHFCLK	Shift Clock
11	GND	
12	GND	
:	:	:
37	GND	
38	GND	
:	:	:
55	+5V	
56	+5V	
:	:	:
57	GND	
58	GND	

Mapping of the LCD-signals for different display types :

	Display-Type	Mono SS	Mono DD	Mono DD	Color TFT	Color TFT
	Width	8-bit	8-bit	16-bit	9/12/16-bit	18/24 bit
	Pixelds/Clock	8	8	16	1	1
Pin	Name					
13	VPNL0		UD3	UD7	B0	B0
14	VPNL1		UD2	UD6	B1	B1
15	VPNL2		UD1	UD5	B2	B2
16	VPNL3		UD0	UD4	B3	B3
17	VPNL4		LD3	UD3	B4	B4
18	VPNL5		LD2	UD2	G0	B5
19	VPNL6		LD1	UD1	G1	B6
20	VPNL7		LD0	UD0	G2	B7
21	VPNL8	P0		LD7	G3	G0
22	VPNL9	P1		LD6	G4	G1
23	VPNL10	P2		LD5	G5	G2
24	VPNL11	P3		LD4	R0	G3
25	VPNL12	P4		LD3	R1	G4
26	VPNL13	P5		LD2	R2	G5
27	VPNL14	P6		LD1	R3	G6
28	VPNL15	P7		LD0	R4	G7
29	VPNL16					R0
30	VPNL17					R1
31	VPNL18					R2
32	VPNL19					R3
33	VPNL20					R4
34	VPNL21					R5
35	VPNL22					R6
36	VPNL23					R7

	Display-Type	Color STN SS	Color STN SS	Color STN DD	Color STN DD	Color STN DD
	Width	8-bit (X4bP)	16-bit (4bP)	8-bit (4bP)	16-bit (4bP)	24 bit
	Pixelds/Clock	2-2/3	5-1/3	2-2/3	5-1/3	8
Pin	Name					
13	VPNL0	R1	R1	UR1	UR0	UR0
14	VPNL1	B1	G1	UG1	UG0	UG0
15	VPNL2	G2	B1	UB1	UB0	UB0
16	VPNL3	R3	R2	UR2	UR1	LR0
17	VPNL4	B3	G2	LR1	LR0	LG0
18	VPNL5	G4	B2	LG1	LG0	LB0
19	VPNL6	R5	R3	LB1	LB0	UR1
20	VPNL7	B5	G3	LR2	LR1	UG1
21	VPNL8	SHFCLKU	B3		UG1	UB1
22	VPNL9		R4		UB1	LR1
23	VPNL10		G4		UR2	LG1
24	VPNL11		B4		UG2	LB1
25	VPNL12		R5		LG1	UR2
26	VPNL13		G5		LB1	UG2
27	VPNL14		B5		LR2	UB2
28	VPNL15		R6		LG2	LR2
29	VPNL16					LG2
30	VPNL17					LB2
31	VPNL18					UR3
32	VPNL19					UG3
33	VPNL20					UB3
34	VPNL21					LR3
35	VPNL22					LG3
36	VPNL23					LB3

				Display-Type	Mono SS	Mono DD	Mono DD	Color TFT
				Width	8-bit	8-bit	16-bit	9/12/ 16-bit
				Pixels/Clock	8	8	16	1
Pin	Name	Channel	Bit	DS90C363 LVDS Transceiver Input				
54/53	VLVDS0P/ VLVDS0N	0	0	IN0				
			1	IN1				
			2	IN2				
			3	IN3				
			4	IN4				
			5	IN5				
			6	IN6				
52/51	VLVDS1P/ VLVDS1N	1	0	IN7				
			1	IN8				
			2	IN9				
			3	IN10				
			4	IN11				
			5	IN12				
			6	IN13				

				Display-Type	Mono SS	Mono DD	Mono DD	Color TFT
				Width	8-bit	8-bit	16-bit	9/12/ 16-bit
				Pixels/Clock	8	8	16	1
Pin	Name	Chan nel	Bit	DS90C363 LVDS Transcei-ver Input				
50/49	VLVDS2P/ 2N	2	0	IN14				
			1	IN15				
			2	IN16				
			3	IN17				
			4	IN18				
			5	IN19				
			6	IN20				
48/47	VLVDS3P/ 3N	3	all	CLKIN				
46/45	VLVDS4P/ 4N	4	0	IN0	0	0	0	0
			1	IN1	P3		LD4	R0
			2	IN2	P4		LD3	R1
			3	IN3	P5		LD2	R2
			4	IN4	P6		LD1	R3
			5	IN5	P7		LD0	R4
			6	IN6		LD2	UD2	G0
44/43	VLVDS5P/ 5N	5	0	IN7		LD1	UD1	G1
			1	IN8		LD0	UD0	G2
			2	IN9	P0		LD7	G3
			3	IN10	P1		LD6	G4
			4	IN11	P2		LD5	G5
			5	IN12	0	0	0	0
			6	IN13		UD3	UD7	B0
42/41	VLVDS6P/ 6N	6	0	IN14		UD2	UD6	B1
			1	IN15		UD1	UD5	B2
			2	IN16		UD0	UD4	B3
			3	IN17		LD3	UD3	B4
			4	IN18	LP	LP	LP	LP
			5	IN19	FLM	FLM	FLM	FLM
			6	IN20	DE	DE	DE	DE
40/39	VLVDS7P/ 7N	7	all	CLKIN	SHFCL K	SHFC L K	SHFC LK	SHFCLK

				Display-Type	Color TFT	Color TFT	Color STN SS
				Width	18/24-bit	36-bit	8-bit (X4bP)
				Pixels/Clock	1	2	2-2/3
Pin	Name	Channel	Bit	DS90C363 LVDS Transceiver Input			
54/53	VLVDS0P/ 0N	0	0	IN0	R2	R00	
			1	IN1	R3	R01	
			2	IN2	R4	R02	
			3	IN3	R5	R03	
			4	IN4	R6	R04	
			5	IN5	R7	R05	
			6	IN6	G2	G00	
52/51	VLVDS1P/ 1N	1	0	IN7	G3	G01	
			1	IN8	G4	G02	
			2	IN9	G5	G03	
			3	IN10	G6	G04	
			4	IN11	G7	G05	
			5	IN12	B2	B00	
			6	IN13	B3	B01	
50/49	VLVDS2P/ 2N	2	0	IN14	B4	B02	
			1	IN15	B5	B03	
			2	IN16	B6	B04	
			3	IN17	B7	B05	
			4	IN18	LP	LP	
			5	IN19	FLM	FLM	
			6	IN20	DE	DE	
48/47	VLVDS3P/ 3N	3	all	CLKIN	SHFCLK	SHFCLK	

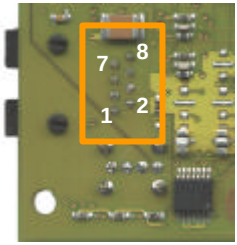
				Display-Type	Color TFT	Color TFT	Color STN SS
				Width	18/24-bit	36-bit	8-bit (X4bP)
				Pixels/Clock	1	2	2-2/3
Pin	Name	Channel	Bit	DS90C363 LVDS Transceiver Input			
46/45	VLVDS4P/4N	4	0	IN0		R10	0
			1	IN1		R11	
			2	IN2		R12	
			3	IN3		R13	
			4	IN4		R14	
			5	IN5		R15	
			6	IN6		G10	G4
44/43	VLVDS5P/ 5N	5	0	IN7		G11	R5
			1	IN8		G12	B5
			2	IN9		G13	SHFCLKU
			3	IN10		G14	
			4	IN11		G15	
			5	IN12		B10	0
			6	IN13		B11	R1
42/41	VLVDS6P/ 6N	6	0	IN14		B12	B1
			1	IN15		B13	G2
			2	IN16		B14	R3
			3	IN17		B15	B3
			4	IN18		0	LP
			5	IN19		0	FLM
			6	IN20		0	DE
40/39	VLVDS7P/ 7N	7	all	CLKIN		SHFCLK	SHFCLK

				Display-Type	Color STN SS	Color STN SS	Color STN DD
				Width	16-bit (4bP)	8-bit (4bP)	16-bit (4bP)
				Pixels/Clock	5-1/3	2-2/32	5-1/3
Pin	Name	Channel	Bit	DS90C363 LVDS Transcei-ver Input			
54/53	VLVDS0P/ 0N	0	0	IN0			
			1	IN1			
			2	IN2			
			3	IN3			
			4	IN4			
			5	IN5			
			6	IN6			
52/51	VLVDS1P/ 1N	1	0	IN7			
			1	IN8			
			2	IN9			
			3	IN10			
			4	IN11			
			5	IN12			
			6	IN13			
50/49	VLVDS2P/ 2N	2	0	IN14			
			1	IN15			
			2	IN16			
			3	IN17			
			4	IN18			
			5	IN19			
			6	IN20			
48/47	VLVDS3P/ 3N	3	all	CLKIN			

				Display-Type	Color STN SS	Color STN SS	Color STN DD
				Width	16-bit (4bP)	8-bit (4bP)	16-bit (4bP)
				Pixels/Clock	5-1/3	2-2/32	5-1/3
Pin	Name	Channel	Bit	DS90C363 LVDS Transceiver Input			
46/45	VLVDS4P/ 4N	4	0	IN0	0	0	0
			1	IN1	B4		UG2
			2	IN2	R5		LG1
			3	IN3	G5		LB1
			4	IN4	B5		LR2
			5	IN5	R6		LG2
			6	IN6	B2	LG1	LG0
44/43	VLVDS5P/ 5N	5	0	IN7	R3	LB1	LB0
			1	IN8	G3	LR2	LR1
			2	IN9	B3		UG1
			3	IN10	R4		UB1
			4	IN11	G4		UR2
			5	IN12	0	0	0
			6	IN13	R1	UR1	UR0
42/41	VLVDS6P/ 6N	6	0	IN14	G1	UG1	UG0
			1	IN15	B1	UB1	UB0
			2	IN16	R2	UR2	UR1
			3	IN17	G2	LR1	LR0
			4	IN18	LP	LP0	LP
			5	IN19	FLM	FLM	FLM
			6	IN20	DE	DE	DE
40/39	VLVDS7P/ 7N	7	all	CLKIN	SHFCLK	SHFCLK	SHFCLK

2.4.8. RJ45 (Ethernet)

Pin	Name
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC



2.4.9. USB 0

Pin	Name
1	VCC
2	USB-
3	USB+
4	GND